

CLAIMS

in Application entitled

DOUBLE BRIDGE INVERTER BALLAST

1. An arrangement comprising:

a DC source operative to supply a unidirectional current at a set of DC terminals;

a gas discharge lamp having lamp terminals; and

electronic circuitry connected between the DC terminals and the lamp terminals; the electronic circuitry:

(a) having AC output terminals connected with the lamp terminals;

(b) being functional to provide a lamp current to the gas discharge lamp; and

(c) including an inverter circuit connected with the DC terminals and functional to provide an AC voltage at the AC output terminals; the inverter circuit being characterized by including an electronic switching device having at least two transistors series-connected between a pair of device terminals; the electronic switching device: (i) conducting current in a periodic manner between its device terminals, and (ii) ~~and~~ having a substantially negligible voltage drop between its device terminals when indeed conducting current.

2. An arrangement comprising:

a DC source operative to supply a unidirectional current at a set of DC terminals;

a gas discharge lamp having lamp terminals; and

electronic circuitry connected between the DC terminals and the lamp terminals; the electronic circuitry being functional to draw unidirectional current from the DC terminals and to supply a lamp current to the lamp terminals; the electronic circuitry being further characterized by including an electronic inverter circuit connected with the DC terminals and operative to cause the lamp current to be supplied to the lamp terminals; the electronic inverter circuit being characterized by including a periodically conducting switching device having at least two transistors series-connected between a pair of device terminals; a device voltage existing between the device terminals; the device voltage being of negligible magnitude during periods when the device is conducting, while being of non-negligible magnitude at times when the device is not conducting.

3. An arrangement comprising:

a DC source operable to supply a unidirectional current at a pair of DC terminals between which exists a pulsating DC supply voltage having an instantaneous absolute magnitude substantially equal to that of a sinusoidal voltage;

a gas discharge lamp having lamp terminals; and

an inverter connected in circuit between the DC terminals and the lamp terminals; the inverter being functional to cause unidirectional current to be drawn from the DC terminals and to cause a lamp current to be supplied to the lamp terminals; the inverter including a switching device having at least two transistors series-connected between a pair of device terminals; a periodically pulsating unidirectional device voltage existing between the device terminals; the device voltage consisting of periods during which its average magnitude is substantially zero interconnected with periods during which its average magnitude is at least half as large as that of the pulsating DC supply voltage.

4. The arrangement of claim 3 wherein: (i) the switching device includes a first and a second transistor having a first and a second control terminal, respectively; (ii) a periodically pulsating unidirectional control voltage exists between the first and the second control terminal; and (iii) the peak magnitude of the periodically pulsating unidirectional control voltage is approximately half that of the periodically pulsating device voltage.

5. The arrangement of claim 3 wherein: (i) the switching device includes a junction terminal at which the two transistors are connected together; (ii) a periodically pulsating unidirectional junction voltage exists between the junction terminal and one of the device terminals; and (iii) the peak magnitude of the periodically pulsating unidirectional junction voltage is approximately half that of the periodically pulsating device voltage.

6. The arrangement of claim 3 wherein the inverter is further characterized by including a second switching device having at least two transistors series-connected between a pair of device terminals; the two switching devices each having a terminal connected to a common conductor.

7. The arrangement of claim 6 wherein the two switching devices are series-connected between the DC terminals.

8. An arrangement comprising:

an AC source operable to supply a power line voltage at a pair of power line terminals;

a gas discharge lamp having lamp terminals; and

ballasting means having power input terminals connected with the power line terminals and ballast output terminals connected with the lamp terminals; the ballasting means being functional to cause a line current to be drawn from the power line terminals and a lamp current to be supplied to the lamp terminals; the ballasting means being further characterized by including: (i) a sub-circuit connected with the power input terminals and operative to provide a DC voltage at a pair of DC terminals; and (ii) an inverter connected between the DC terminals and the ballast output terminals; the inverter being characterized by including a switching device having two transistors series-connected between a pair of device terminals connected with other circuitry within the inverter; a periodically pulsating unidirectional device voltage existing between the device terminals; the periodically pulsating unidirectional device voltage being characterized by consisting of time-segments during which its average magnitude is substantially zero alternating with time-segments during which its average magnitude is at least half as large as that of the DC voltage.

9. An arrangement comprising:

an AC source operable to supply a power line voltage at a pair of power line terminals;

a gas discharge lamp having lamp terminals; and

ballasting means having power input terminals connected with the power line terminals and ballast output terminals connected with the lamp terminals; the ballasting means being functional to draw a line current from the power line terminals and to supply an alternating lamp current to the lamp terminals; the ballasting means being further characterized by including: (i) sub-circuitry connected with the power input terminals and operative to provide a DC voltage at a pair of DC terminals; and (ii) an inverter connected between the DC terminals and the ballast output terminals and characterized by including a switching device having at least two transistors series-connected between a pair of device terminals connected with other circuitry within the inverter and having thereacross a device voltage characterized by periodically being of zero magnitude for a duration equal to about half the duration of a complete cycle of the alternating lamp current.

10. An arrangement comprising:

an AC source operable to supply a power line voltage at a pair of power line terminals;

a gas discharge lamp having lamp terminals; and

ballasting means having power input terminals connected with the power line terminals and ballast output terminals connected with the lamp terminals; the ballasting means being functional to draw a line current from the power line terminals and to supply an alternating lamp current to the lamp terminals; the ballasting means being further characterized by including: (i) sub-circuitry connected with the power input terminals and operative to provide a DC voltage at a pair of DC terminals; and (ii) an inverter connected between the DC terminals and the ballast output terminals and operative to cause the alternating lamp current to be supplied to the lamp terminals; the inverter being additionally characterized by including a first and a second switching device; the first switching device having two transistors series-connected between a first pair of device terminals; the second switching device having two transistors series-connected between a second pair of device terminals; the two switching devices being series-connected between the DC terminals.

11. An arrangement comprising:

an AC source operable to supply a power line voltage at a pair of power line terminals;

a gas discharge lamp having lamp terminals; and

ballasting means having power input terminals connected with the power line terminals and ballast output terminals connected with the lamp terminals; the ballasting means being functional to draw a line current from the power line terminals and to supply an alternating lamp current to the lamp terminals; the ballasting means being further characterized by including: (i) sub-circuitry connected with the power input terminals and operative to provide a DC voltage at a pair of DC terminals; and (ii) an inverter connected between the DC terminals and the ballast output terminals and operative to cause the alternating lamp current to be supplied to the lamp terminals; the inverter being additionally characterized by including two switching devices; each switching device having two transistors series-connected between a pair of device terminals; the two switching devices each having one of its device terminals connected with one of the DC terminals; a periodically pulsating voltage existing across each of the pairs of device terminals; this voltage being periodically of zero magnitude..

12. An arrangement comprising:

a source operable to supply a power line voltage at a pair of power line terminals;

a gas discharge lamp having lamp terminals; and

ballasting means having power input terminals connected with the power line terminals and ballast output terminals connected with the lamp terminals; the ballasting means being functional to draw a line current from the power line terminals and to supply an alternating lamp current to the lamp terminals; the ballasting means being further characterized by including:

- (i) sub-circuitry connected with the power input terminals and operative to provide a DC voltage at a pair of DC terminals; and
- (ii) an inverter connected between the DC terminals and the ballast output terminals and operative to cause the alternating lamp current to be supplied to the lamp terminals; the inverter being additionally characterized by including a switching device having two transistors series-connected between a pair of device terminals; a current periodically flowing between the device terminals; a voltage existing across the device terminals; the voltage having an absolute magnitude that varies periodically between a relatively low level and a relatively high level; the current flowing only when the absolute magnitude is equal to or lower than the relatively low level.

13. The arrangement of claim 12 wherein the relatively low level is lower than one quarter of the relatively high level.

14. An arrangement comprising:

an AC source operable to supply a power line voltage at a pair of power line terminals;

a gas discharge lamp having lamp terminals; and

ballasting means having power input terminals connected with the power line terminals and ballast output terminals connected with the lamp terminals; the ballasting means being functional to draw a line current from the power line terminals and to supply an alternating lamp current to the lamp terminals; the ballasting means being further characterized by including circuitry connected with the power input terminals and operative to cause the alternating lamp current to be supplied to the lamp terminals; the circuitry being additionally characterized by including a switching device having two transistors series-connected between a pair of device terminals; each of the two transistors periodically alternating between being conductive and being non-conductive in such manner that most of the time they are both conductive or they are both non-conductive.

15. An arrangement comprising:

an AC source operable to supply a power line voltage at a pair of power line terminals;

a gas discharge lamp having lamp terminals; and

ballasting means having power input terminals connected with the power line terminals and ballast output terminals connected with the lamp terminals; the ballasting means being functional to draw a line current from the power line terminals and to supply an alternating lamp current to the lamp terminals; the ballasting means being further characterized by including circuitry connected with the power input terminals and operative to cause the alternating lamp current to be supplied to the lamp terminals; the circuitry being additionally characterized by: (i) including a first switching device having two transistors series-connected between a first pair of device terminals; (ii) including a second switching device having two transistors series-connected between a second pair of device terminals; and (iii) having a substantially sinusoidal voltage existing between one of the first device terminals and one of the second device terminals.

16. An arrangement comprising:

an AC source operable to supply a power line voltage at a pair of power line terminals;

a gas discharge lamp having lamp terminals; and

ballasting means having power input terminals connected with the power line terminals and ballast output terminals connected with the lamp terminals; the ballasting means being functional to draw a line current from the power line terminals and to supply a periodically alternating lamp current to the lamp terminals; the periodically alternating lamp current having a fundamental period; the ballasting means being further characterized by including circuitry connected with the power input terminals and operative to cause the lamp current to be supplied to the lamp terminals; the circuitry being additionally characterized by: (i) including a switching device having two transistors series-connected between a pair of device terminals; (ii) having a periodically pulsating unidirectional voltage exist between the device terminals; and (iii) having a current flowing through both transistors once for a certain length of time during each fundamental period of the lamp current.

17. The arrangement of claim 16 wherein the certain length of time is approximately equal to half of the total duration of the fundamental period of the lamp current.